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1998 AGRICULTURAL CHEMICAL USAGE

This report is the ninth annual Field Crops Summary issued by NASS containing on-farm agricultural chemical use statistics. The data presented in this report are part of the data series on chemical use funded through the Water Quality Initiative.The Water Quality Initiative is a multi-agency program designed to provide information for farmers, ranchers, and foresters to address on-farm and off-farm environmental issues. In the past, there has been an inadequate amount of farm level data to determine the magnitude of water quality problems or to permit an assessment of alternatives for farmers and other affected parties. This report and other agricultural chemical reports help fill the needs of analysts evaluating the complex environmental issues of the 1990's.

CORN

Nitrogen was applied to 98% of the total 1998 corn acreage in the 16 States surveyed. All of the surveyed States had 88% or more of their acreage treated with nitrogen. Growers used an average of 1.7 treatments per acre and used an average 80 pounds per treatment. In the States surveyed, 83% of the planted corn acreage received phosphate fertilizer. Potash fertilizer was applied to 67 percent of the acreage.

Herbicides were applied to 96% of the total corn acreage in the survey, while insecticides were used on 30% of the acreage. Atrazine was the most used herbicide with 69% of the reported acreage being treated. Atrazine was applied at the rate of 0.99 pound per acre. Metolachlor and Acetochlor were the next two most widely used herbicides and they were applied to 32% and 25% of the reported acreage, respectively. Chlorpyrifos and Terbufos were the most widely used insecticides with 6% of the reported acreage. Chlorpyrifos was applied at the rate of 1.01 pounds per acre and Terbufos was applied at 1.13 pounds per acre.

In Nebraska, nitrogen was applied to 99% of the acreage, phosphates to 70% and potash to 21%. Herbicides were applied to 93% of the corn acreage while insecticide application covered 44%. There were a total of 196 usable reports. At the national level, the 16 states surveyed accounted for 89.0% of the U.S. corn acres planted in 1998.

Corn: Acreage--Percent Receiving Chemicals, Number of Applications, Rate per Application, 1998

State	Area Planted	Nitrogen			Phosphate			Potash			Herbicide	Insecticide
		Area 1/ Applied	Applica-tions	Rate Per Application	Area 1/ Applied	Applica-tions	Rate Per Application	Area 1/ Applied	Applica-tions	Rate Per Application	Area Applied	Area Applied
	1,000 Acres	Percent	Number	Pounds	Percent	Number	Pounds	Percent	Number	Pounds	Percent	Percent
Iowa	12,500	96	1.5	83	81	1.0	59	81	1.0	78	98	18
Minnesota	7,300	96	1.6	78	91	1.0	52	87	1.1	66	97	10
Missouri	2,650	100	1.4	130	92	1.0	56	94	1.0	74	95	44
Nebraska	8,800	99	1.8	71	70	1.1	32	21	1.2	15	93	44
So. Dak.	3,900	94	1.3	62	78	1.0	38	25	1.0	22	95	3/
Total 2/	71,390	98	1.7	80	83	1.1	51	67	1.1	76	96	30

1/ Refers to acres reported as receiving one or more applications of a specific fertilizer ingredient. 2/ States surveyed were CO, IL, IN, IA, KS, KY, MI, MN, MO, NE, NC, OH, PA, SD, WI. 3/ Insufficient reports.

Corn: Frequency and Extent of Pesticide Usage By Active Ingredient, Nebraska, 1997-1998

Agricultural Chemical 1/	Area Applied 2/		Applications		Rate per Application		Rate per Crop Year		Total Applied	
	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998
Herbicides:	Percent		Number		Pounds per acre				1,000 pounds	
2,4-D	9	10	1.0	1.2	0.51	0.51	0.52	0.64	417	553
Acetochlor	28	18	1.0	1.0	1.65	2.04	1.65	2.04	4,083	3,239
Alachlor	8	11	1.0	1.0	1.55	1.56	1.55	1.56	1,156	1,462
Atrazine	73	63	1.1	1.0	0.98	0.93	1.07	0.98	6,978	5,382
Bromoxynil	2	3	1.0	1.0	0.31	0.29	0.31	0.29	68	72
Clopyralid	---	7	---	1.0	---	0.07	---	0.07	---	43
Cyanazine	10	6	1.0	1.0	1.23	1.13	1.23	1.21	1,144	606
Dicamba	15	8	1.0	1.0	0.32	0.21	0.32	0.21	418	142
Dimethenamid	3	2	1.0	1.0	1.06	1.60	1.06	1.60	249	315
Flumetsulam	---	7	---	1.0	---	0.03	---	0.03	---	16
Glyphosate	5	5	1.0	1.0	0.46	0.64	0.46	0.64	222	298
Halosulfuron	3	6	1.0	1.0	0.04	0.04	0.04	0.04	10	18
Imazethapyr	---	2	---	1.0	---	0.02	---	0.02	---	3
Metolachlor	35	47	1.0	1.0	1.39	1.59	1.43	1.68	4,522	6,928
Nicosulfuron	4	3	1.0	1.0	0.02	0.03	0.02	0.03	9	9
Paraquat	1	---	1.0	---	0.49	---	0.49	---	57	---
Pendimethalin	---	2	---	1.0	---	0.49	---	0.49	---	74
Primisulfuron	19	3	1.0	1.0	0.01	0.02	0.01	0.02	24	6
Prosulfuron	17	3	1.0	1.0	0.01	0.02	0.01	0.02	20	5
Rimsulfuron	3	---	1.0	---	0.01	---	0.01	---	2	---
Thifensulfuron	3	---	1.0	---	0.004	---	0.004	---	1	---
Insecticides:										
Bt (Bacillus thur.) 3/	6	---	1.0	---	---	---	---	---	---	---
Carbofuran	10	---	1.0	---	0.98	---	0.98	---	879	---
Chlorpyrifos	6	5	1.2	1.0	0.55	0.67	0.68	0.67	382	317
Cyfluthrin	---	12	---	1.0	---	0.006	---	0.006	---	7
Methyl parathion	---	3	---	1.1	---	0.31	---	0.34	---	84
Permethrin	10	3	1.0	1.0	0.09	0.07	0.09	0.07	79	20
Tebupirimphos	---	12	---	1.0	---	0.12	---	0.12	---	129
Tefluthrin	23	8	1.1	1.0	0.12	0.10	0.13	0.10	270	68
Terbufos	8	9	1.0	1.0	0.99	1.10	0.99	1.15	748	926

1/ Insufficient reports to publish data for the following agricultural chemicals: Herbicides: Ametryn, Bromoxynil, Butylate, Clopyralid, EPTC, Flumetsulam, Imazethapyr, Metribuzin, Pendimethalin, Pyridate, Sethoxydim, Trifluralin. Insecticides: Aldicarb, Bifenthrin, Chlorethoxyfos, Cyfluthrin, Diazinon, Dimethoate, Fonofos, Lambacyhalothrin, Methyl parathion, Phorate, Phostebupirim,Tebupirimphos. 2/ Refers to acres reported as receiving one or more applications of a specific agricultural chemical. 3/ Rates and

total applied are not available because amounts of active ingredients are not comparable between products.

WINTER WHEAT

Nitrogen fertilizer was applied to 89% of the winter wheat harvested acres in the 19 surveyed States. Phosphate fertilizers were applied to 63% of the collective acreage, ranging from just 9% in Oregon to 93% in Ohio. All surveyed States treated at least a portion of the acreage with herbicides; 2,4-D was again the most prevalent in terms of area and total application. The surveyed States represented 40.4 million acres in 1998 and 87% of the U.S. winter wheat acreage.

In Nebraska, nitrogen was applied to 85% of the acreage and phosphates to 59%. Herbicides were applied to 52% of the acreage. There were a total of 59 usable reports.

Winter Wheat: Acreage--Percent Receiving Chemicals, Number of Applications, Rate per Application, 1998

State	Area Harvested	Nitrogen			Phosphate			Potash			Herbicide	Insecticide
		Area 1/ Applied	Applica-tions	Rate Per Application	Area 1/ Applied	Applica-tions	Rate Per Application	Area 1/ Applied	Applica-tions	Rate Per Application	Area Applied	Area Applied
	1,000 Acres	Percent	Number	Pounds	Percent	Number	Pounds	Percent	Number	Pounds	Percent	Percent
Colorado	2,750	78	1.5	35	33	1.0	24	4	1.0	6	61	--
Kansas	10,700	92	1.5	39	74	1.0	30	13	1.0	34	35	--
Nebraska	1,900	85	1.4	32	59	1.0	22	12	1.0	4	52	--
So. Dak.	1,500	94	1.5	37	92	1.0	26	2/	2/	2/	88	--
Total 3/	40,420	89	1.6	42	63	1.0	34	22	1.0	46	47	3

1/ Refers to acres reported as receiving one or more applications of a specific fertilizer ingredient. 2/ Insufficient reports to publish state level usage estimates.
3/ Total includes: CA, CO, GA, ID, IL, KS, LA, MN, MS, MO, MT, NE, NC, OH, OK, OR, SD, TX, WA.

Winter Wheat: Frequency and Extent of Herbicide Usage By Active Ingredient, 1997-1998

Agricultural Chemical	Area Applied 2/		Applications		Rate per Application		Rate per Crop Year		Total Applied	
	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998
	Percent		Number		Pounds per acre				1,000 pounds	
NEBRASKA 1/										
2,4-D	29	32	1.0	1.0	0.32	0.44	0.32	0.44	177	266
Chlorsulfuron	---	3	---	1.0	---	0.01	---	0.01	---	1
Metsulfuron-methyl	24	29	1.0	1.0	0.004	0.004	0.004	0.004	2	2
Triasulfuron	17	8	1.0	1.0	0.01	0.01	0.01	0.01	4	2
SURVEYED STATES										
2,4-D	24	24	1.0	1.0	0.41	0.43	0.42	0.46	3,486	4,442
Bromoxynil	4	2	1.0	1.0	0.24	0.25	0.25	0.25	353	217
Chlorsulfuron	11	11	1.0	1.0	0.01	0.01	0.01	0.01	44	61
Clopyralid	---	4/	---	1.0	---	0.08	---	0.08	---	7
Dicamba	6	7	1.1	1.0	0.10	0.10	0.11	0.11	237	297
Diclofop-methyl	1	1	1.0	1.0	0.81	0.70	0.81	0.70	177	266
Difenzoquat	4/	4/	1.0	1.0	0.52	0.50	0.52	0.50	78	56
Diuron	4/	4/	1.0	1.0	1.35	0.98	1.35	0.98	45	73
Fenoxaprop	1	4/	1.0	1.0	0.05	0.08	0.05	0.08	10	7
Glyphosate	6	8	1.2	1.2	0.36	0.34	0.45	0.42	978	1,423
Imazamethabenz	1	1	1.0	1.0	0.33	0.33	0.33	0.33	67	71
MCPA	5	6	1.0	1.0	0.30	0.33	0.30	0.33	488	784
Metribuzin	2	2	1.1	2.1	0.27	0.15	0.29	0.31	193	299
Metsulfuron-methyl	14	15	1.0	1.0	0.003	0.003	0.003	0.003	15	21
Picloram	---	1	---	1.0	---	0.02	---	0.02	---	11
Prosulfron	---	4/	---	1.0	---	0.01	---	0.01	---	2
Thifensulfuron	7	5	1.0	1.0	0.01	0.01	0.01	0.01	34	30
Triallate	1	1	1.0	1.0	0.09	1.07	1.09	1.07	418	310
Triasulfuron	5	6	1.0	1.0	0.01	0.01	0.01	0.01	26	28
Tribenuron-methyl	8	6	1.0	1.0	0.007	0.007	0.007	0.007	20	18

1/ Insufficient reports to publish data for the following agricultural chemicals. Herbicides: Atrazine, Dicamba, Glyphosate, Paraquat, Thifensulfuron, Tribenuron-methyl. 2/ Refers to acres reported as receiving one or more applications of a specific agricultural chemical. 3/ Surveyed states 1997: CO, ID, IL, KS, MO, MT, NE, OH, OK, OR, PA, SD, TX, WA. 1998: CA, CO, GA, ID, IL, KS, LA, MN, MS, MO, MT, NE, NC, OH, OK, OR, SD, TX, WA. 4/ Less than one percent.

Data Reliability

The probability nature of the survey provides expansion of data so that the estimates are statistically representative of chemical use on the targeted crops in the surveyed States. A complete census may have yielded different results. The reliability of these survey results are affected by sampling variability and non-sampling errors. Sampling variability of the estimates differed considerably by chemical and crop. In general, the more often the chemical was applied, the smaller the sampling variability.

SOYBEANS

Soybean producers in the 16 States surveyed applied nitrogen fertilizer to 17% of the area planted to soybeans. The percent of acres treated ranged from 3% in Louisiana to 72% in Michigan. The average number of nitrogen applications per acre was 1.1 with an average application rate of 20 pounds per acre. Phosphate was applied on 24% of the soybean planted acreage in the surveyed States. Producers in Michigan applied phosphate to 73% of the soybean acreage, while Mississippi applications covered only 10% of the soybean acrage. Potash was applied to 27% of the planted soybean acreage.

In the 16 States surveyed, an average of 95% of the soybean acreage was treated with herbicides. The most widely used herbicides were glyphosate, applied to 46% of the soybean acres, followed by pendimethalin and imazethapyr applied to 18% and 17% of the acreage, respectively. Growers in the surveyed states applied insecticide to only 2% of the total soybean acres planted. With the exception of insecticide applications in Arkansas, Louisiana, Mississippi, and North Carolina, there were too few reports to publish individual state data for insecticides. Growers reported few fungicide or other chemical applications.

In Nebraska, nitrogen was applied to 22% of the soybean acreage, phosphates to 19%, and potash to 8%. Herbicides were applied to 88% of the soybean acreage while insecticides were not reported as being applied. There were a total of 166 usable reports. At the national level, the 16 states surveyed in 1998 covered 91% of the U.S. soybean acreage planted.

Soybeans: Acreage--Percent Receiving Chemicals, Number of Applications, Rate per Application, 1998

State	Area Planted	Nitrogen			Phosphate			Potash			Herbicide
		Area 1/ Applied	Applica-tions	Rate Per Application	Area 1/ Applied	Applica-tions	Rate Per Application	Area 1/ Applied	Applica-tions	Rate Per Application	Area Applied
	1,000 Acres	Percent	Number	Pounds	Percent	Number	Pounds	Percent	Number	Pounds	Percent
Iowa	10,500	10	1.1	18	13	1.0	47	14	1.0	52	100
Minnesota	6,900	18	1.1	21	17	1.0	33	9	1.0	56	97
Missouri	5,100	24	1.0	21	47	1.0	50	53	1.0	73	92
Nebraska	3,800	22	1.1	14	19	1.0	37	8	1.2	22	88
Total 2/	65,745	17	1.1	20	24	1.0	47	27	1.0	78	95

1/ Refers to acres receiving one or more applications of a specific fertilizer ingredient. 2/ States surveyed: AR, IL, IN, IA, KS, KY, LA, MI, MN, MS, MO, NE, NC, OH, SD, TN.

Soybeans: Frequency and Extent of Herbicide Usage By Active Ingredient, Nebraska, 1997-1998

Agricultural Chemical 1/	Area Applied 2/		Applications		Rate per Application		Rate per Year		Total Applied	
	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998
	Percent		Number		Pounds per acre				1,000 pounds	
2,4-D	---	7	---	1.0	---	0.42	---	0.42	---	111
Acifluorfen	10	---	1.0	---	0.20	---	0.20	---	70	---
Alachlor	10	5	1.0	1.1	2.10	1.21	2.10	1.38	754	267
Bentazon	5	---	1.0	---	0.83	---	0.83	---	152	---
Chlorimuron-ethyl	21	7	1.0	1.0	0.01	0.01	0.01	0.01	9	3
Clethodim	3	---	1.0	---	0.09	---	0.09	---	11	---
Clomazone	7	5	1.0	1.0	0.58	0.35	0.58	0.35	138	67
Fenoxaprop	3	---	1.0	---	0.11	---	0.11	---	12	---
Fluazifop-P-butyl	6	---	1.0	---	0.04	---	0.04	---	9	---
Flumetsulam	6	4	1.0	1.0	0.05	0.06	0.05	0.06	9	9
Glyphosate	26	59	1.4	1.2	0.59	0.65	0.85	0.83	773	1,852
Imazamox	---	2	---	1.0	---	0.04	---	0.04	---	2
Imazaquin	11	---	1.0	---	0.07	---	0.07	---	27	---
Imazethapyr	38	16	1.0	1.0	0.05	0.04	0.05	0.04	69	25
Metolachlor	5	7	1.0	1.0	1.83	1.08	1.83	1.08	289	286
Metribuzin	8	4	1.0	1.0	0.22	0.16	0.22	0.16	59	25
Pendimethalin	26	14	1.0	1.0	0.89	0.80	0.91	0.81	815	438
Quizalofop-ethyl	4	1	1.0	1.0	0.05	0.05	0.05	0.05	7	2
Sethoxydim	11	---	1.0	---	0.25	---	0.25	---	100	---
Sulfenthrazone	---	2	---	1.0	---	0.12	---	0.12	---	10
Thifensulfuron	13	2	1.0	1.0	0.003	0.003	0.003	0.003	2	3/
Trifluralin	28	26	1.0	1.0	0.74	1.02	0.74	1.03	729	1,017

1/ Insufficient reports to publish data for the following agricultural chemicals. Herbicides: Atrazine, Clopyralid, Cloramben, Dimenyhenamid, Ethalfluralin, Flumiclorac Pentyl, Fomesafen, Linuron. 2/ Refers to acres receiving one or more applications of a specific agricultural chemical. 3/ Total applied is less than 1,000 pounds.

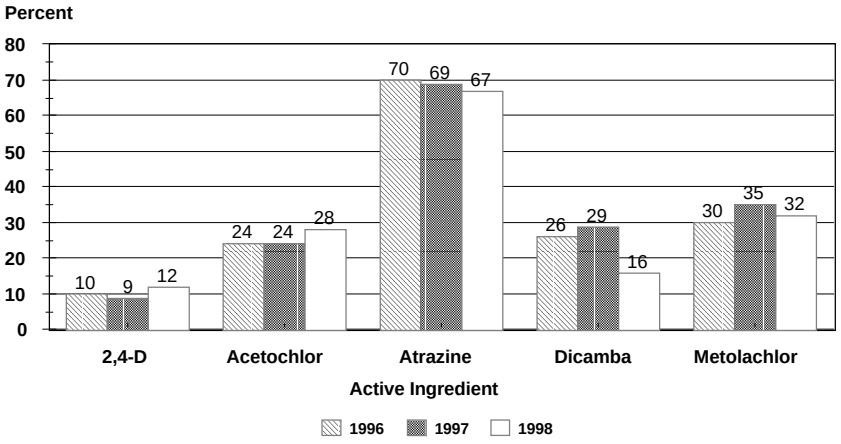
Terms and Definitions

Agricultural chemicals refer to ingredients in both fertilizer and pesticide products. Fertilizer, in this report, refers to applications of nitrogen, phosphate, and potash. Pesticides include any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest, and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant. Pests targeted by pesticides include weeds, insects, fungi, and other forms of life. Herbicides, insecticides, fungicides, and other chemicals make up the four classes of pesticides presented in this report. Miticides and nematicides are included as insecticides. Soil fumigants, growth regulators, defoliants, and desiccants are included as other chemicals. This report excludes pesticides used for seed treatments, post-harvest applications to the commodity, and spot treatments.

Active ingredient is the specific chemical which kills or controls the target pests. Trade name is the actual product name given to a specific formulation of a pesticide product. A formulation contains a specific concentration of the active ingredient, carrier materials, and other ingredients such as emulsifiers and wetting agents. Some formulations, as in the case of pre-mixes, can contain more than one active ingredient.

Corn - Percent of Acres Treated

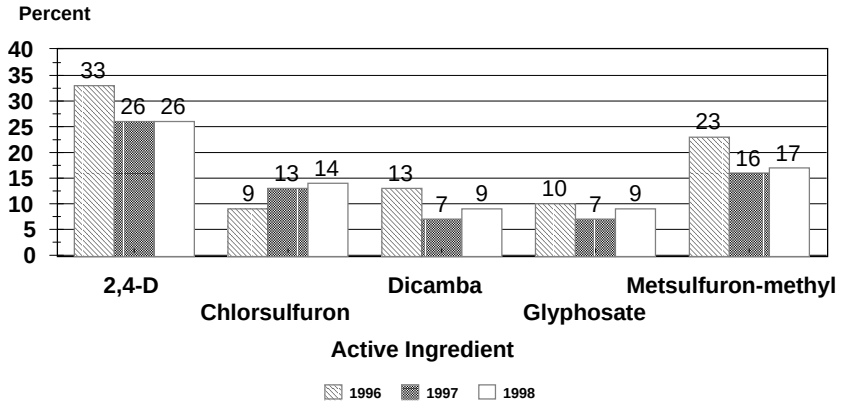
Top 5 Active Ingredients for 1998
Comparison to 10 Comparable States



Comparable states are IL, IN, IA, MI, MN, MO, NE, OH, SD, and WI.

Winter Wheat - Percent of Acres Treated

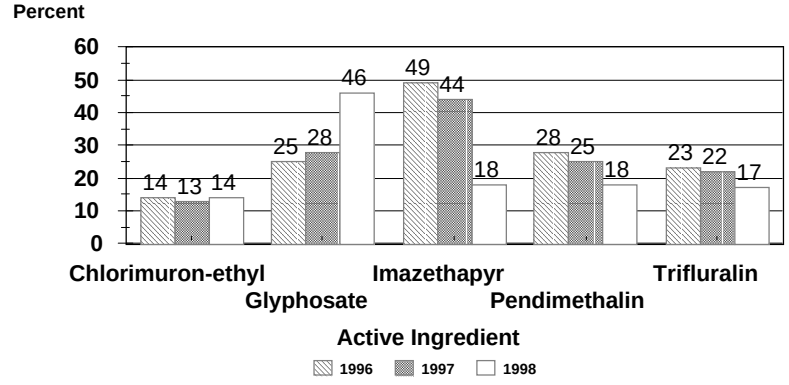
Top 5 Active Ingredients for 1998
Comparison to 10 Comparable States



Comparable states are CO, ID, KS, MT, NE, OK, OR, SD, TX and WA.

Soybeans - Percent of Acres Treated

Top 5 Active Ingredients for 1998
Comparison to 11 Comparable States



Comparable states are AR, IL, IN, IA, LA, MN, MS, MO, NE, OH and TN.

PESTICIDES: Common Names of Active Ingredients and Trade Names

Herbicide Active Ingredient	Trade Name
2,4-D	several
Acetochlor	Harness, Topnotch
Acifluorfen	Blazer, Tackle
Alachlor	Lasso
Atrazine	AAtrex, Atrazine
Bentazon	Basagran, Pledge
Bromoxynil	Brominal, Buctril
Chlorimuron-ethyl	Classic
Chlorsulfuron	Glean
Clethodim	Select
Clomazone	Command
Clopyracid	Reclaim, Stinger
Cyanazine	Bladex, Conquest, Cycle, Extrazine
Dicamba	Banvel
Diclofop-methyl	Hoelon
Dimethenamid	Frontier, Guardsman
Fenoxaprop	Whip, Option
Fluazifop-P-butyl	Fusilade
Flumetsulam	Broadstrike
Glyphosate	Ranger, Rattler, Rodeo, Roundup
Halosulfuron	Battalion, Permit
Imazeamethabenz	Assert
Imazamox	Raptor
Imazaquin	Scepter
Imazethapyr	Pursuit
MCPA	several
Metolachlor	Dual
Metribuzin	Axiom, Lexone, Sencor
Metsulfuron-methyl	Ally
Nicosulfuron	Accent
Paraquat	Cyclone, Gramoxone, Starfire
Pendimethalin	Prowl
Primisulfuron	Beacon
Prosulfuron	Peak
Quizalofop-ethyl	Assure
Rimsulfuron	Basis
Sethoxydim	Poast
Sulfentrazone	Authority, Canopy
Thifensulfuron	Pinnacle
Triallate	Far-Go
Triasulfuron	Amber
Tribenuron-methyl	Express
Trifluralin	Treflan, Trific, Trilin

Insecticide Active Ingredient	Trade Name
Bt (Bacillus thuringiensis)	several
Carbofuran	Furadan
Chlorpyrifos	Dursban, Lorsban
Cyfluthrin	Baythroid
Methyl parathion	several
Permethrin	Ambush, Pounce
Tebupirimphos	Aztec
Tefluthrin	Force
Terbufos	Counter